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(54) ADHESIVE FILM

(57)Abstract:

PROBLEM TO BE SOLVED: To prepare a polyimide film having excellent micromachining properties and exhibiting sufficient heat resistance and adhesion, and an adhesive film composed of a polyimide-based adhesive.

SOLUTION: Micromachining properties which have not attained heretofore are realized by designing the adhesive film to be constituted of a releasable protective film and, laminated thereon, an adhesive layer which is composed of a solvent-soluble thermoplastic polyimide, an epoxy resin and a curing agent and can be bonded at 200° C or lower and designing the adhesive layer to have a thickness of 10 µm or less. The adhesive layer is constituted of a solvent-soluble thermoplastic polyimide resin, an epoxy resin and a curing agent, thereby to realize excellence in adhesive properties and heat resistance.

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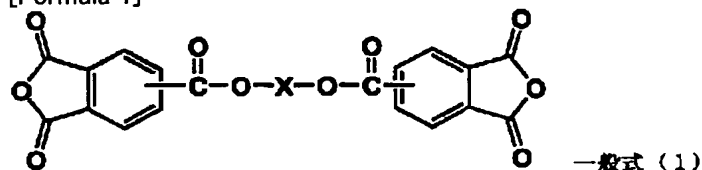
CLAIMS

[Claim(s)]

[Claim 1] The adhesive film which carried out the laminating of the adhesives layer which can be pasted up below 200 degrees C which contains solvent fusibility thermoplasticity polyimide, an epoxy resin, and a curing agent on the protection film which has a mold-release characteristic by the thickness of 10 micrometers or less.

[Claim 2] More than 50 mol % of the acid 2 anhydride residue which the glass transition temperature of said solvent fusibility thermoplasticity polyimide is 200 degrees C or less, and is contained in this fusibility thermoplasticity polyimide is a general formula (1).

[Formula 1]

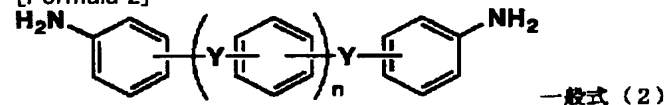


(式中、Xは $-(CH_2)_k-$ 、または芳香環を含む二価の基を示し、kは1以上10以下の整数である。)

The adhesive film according to claim 1 which comes out and is characterized by being the ester acid 2 anhydride residue expressed.

[Claim 3] More than 50 mol % of the diamine residue by which said solvent fusibility thermoplasticity polyimide is contained in this polyimide is the following general formula (2).

[Formula 2]



(式中、Yは $-C(=O)-$ 、 $-SO_2-$ 、 $-O-$ 、 $-S-$ 、 $-(CH_2)_m-$ 、 $-NHCO-$ 、 $-C(CH_3)_2-$ 、 $-C(CF_3)_2-$ 、 $-C(=O)O-$ 、または単結合を示す。
mおよびnは1以上5以下の整数である。)

The adhesive film according to claim 1 or 2 which comes out and is characterized by being the residue of a diamine compound expressed.

[Claim 4] An adhesive film given in any 1 term of claims 1-3 whose protection films which have said mold-release characteristic are films processed by the silicon system processing agent.

[Claim 5] The lamination approach of the adhesive film characterized by removing the protection film which has a mold-release characteristic after sticking an adhesive film given in any 1 term of claims 1-4 on adherend in the condition with a protection film of having a mold-release characteristic for a glue line.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the adhesive film for semi-conductor immobilization with which micro processing is called for. Furthermore, it is related with an adhesive film useful in the field as which micro-processing nature, such as a tape for a flexible printed circuit board and TAB (Tape Automated bonding), a compound leadframe, a charge of a laminated wood, and electronic parts, thermal resistance, and an adhesive property are required in detail.

[0002]

[Description of the Prior Art] In recent years, advanced features of electronic equipment, high-performance-izing, and a miniaturization are progressing, and the miniaturization to the electronic parts used in connection with them and lightweight-ization have been called for. Therefore, high density and what is highly efficient and highly efficient have come to be called for more also for the wiring material or wiring components which mount the semiconductor device package approach and them. The charge of a binder which can be used especially suitable for printed wired board ingredients, such as high-density-assembly ingredients, such as a semiconductor package, COL and a LOC package, and MCM (Multi Chip Module), and Multilayer FPC, and which shows an adhesive property possible [micro processing] and good is called for.

[0003] In this field, the adhesive film which carried out the laminating of the adhesives of a phenol system and an epoxy system and the acrylic adhesives to one side or both sides of a polyimide film until now was used. These adhesive films are difficult to obtain a thin adhesive film 10 micrometers or less in order to use a polyimide film as a base film. Since the laminating of the dissimilar material is furthermore carried out, a difference arises in workability and it is not suitable for the application asked for micro processing.

[0004] Moreover, there is a polyimide monolayer film as an ingredient which is excellent in respect of dependability, such as thermal resistance and an electrical property.

[0005] Since it excels in thermal resistance also in various organic polymers, to space and the aeronautical-navigation field, polyimide is used broadly and used also as a charge of a binder. However, heat-resistant high polyimide system adhesives require the elevated temperature around 300 degrees C, and the high-pressure force, in order to paste up, and adhesive strength cannot say them with it being so high, either.

[0006]

[Problem(s) to be Solved by the Invention] Then, this invention persons came to complete this invention, as a result of micro processing's inquiring wholeheartedly for the purpose of offering an easy adhesive film, having solved the above-mentioned technical problem and maintaining thermal resistance and an adhesive property.

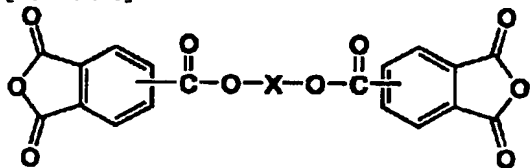
[0007]

[Means for Solving the Problem] This invention offers the new adhesive film which consists of the following configurations, and, thereby, the above-mentioned purpose is attained.

- 1) The adhesive film which carried out the laminating of the adhesives layer which can be pasted up below 200 degrees C which contains solvent fusibility thermoplasticity polyimide, an epoxy resin, and a curing agent on the protection film which has a mold-release characteristic by the thickness of 10 micrometers or less.
- 2) More than 50 mol % of the acid 2 anhydride residue which the glass transition temperature of said solvent fusibility thermoplasticity polyimide is 200 degrees C or less, and is contained in this fusibility thermoplasticity polyimide is a general formula (1).

[0008]

[Formula 3]



一般式 (1)

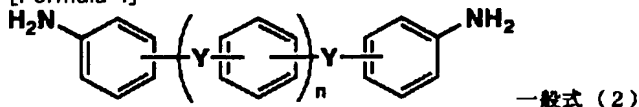
(式中、Xは $-(CH_2)_k-$ 、または芳香環を含む二価の基を示し、kは1以上10以下の整数である。)

The adhesive film according to claim 1 which comes out and is characterized by being the ester acid 2 anhydride residue expressed.

3) More than mol % of the diamine residue by which said solvent fusibility thermoplasticity polyimide is contained in this polyimide is the following general formula (2).

[0009]

[Formula 4]



(式中、Yは $-\text{C}(=\text{O})-$ 、 $-\text{SO}_2-$ 、 $-\text{O}-$ 、 $-\text{S}-$ 、
 $-(\text{CH}_2)_m-$ 、 $-\text{NHCO}-$ 、 $-\text{C}(\text{CH}_3)_2-$ 、
 $-\text{C}(\text{CF}_3)_2-$ 、 $-\text{C}(=\text{O})\text{O}-$ 、または単結合を示す。
 mおよびnは1以上5以下の整数である。)

An adhesive film given in 1 or 2 which comes out and is characterized by being the residue of a diamine compound expressed.

4) An adhesive film given in any 1 term of 1-3 whose protection film which has said mold-release characteristic is a film processed by the silicon system processing agent.

5) The lamination approach of the adhesive film characterized by removing the protection film which has a mold-release characteristic after sticking an adhesive film given in said any 1 term of 1-4 on adherend in the condition with a protection film of having a mold-release characteristic for a glue line.

[0010]

[Embodiment of the Invention] The adhesive film of this invention can be used for example, for the adhesive film for semi-conductor immobilization etc., on the protection film which performed mold release processing, carries out the laminating of the adhesives layer which can be pasted up below 200 degrees C which consists of solvent fusibility thermoplasticity polyimide, epoxy resins, and curing agents by the thickness of 10 micrometers or less, and is obtained.

[0011] The protection film to be used may be the other film although heat-resistant films, such as PET, PEN, PPS, and polyimide, are desirable. 5-200 micrometers of thickness are 10-100 micrometers preferably. The film which processed these protection films by the silicon system processing agent is also used preferably.

[0012] It is important for the thickness of a glue line that it is 10 micrometers or less. It is 3-7 micrometers preferably. If thick, it will become a thing inferior to micro-processing nature, and if too conversely thin, it will be dealt with and a sex will worsen.

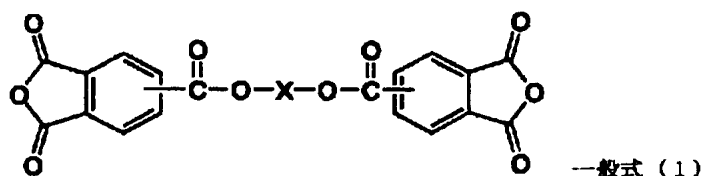
[0013] After the adhesive film for semi-conductor immobilization of this invention sticks a glue line on adherend in the condition with a protection film of having a mold-release characteristic, the protection film which has a mold-release characteristic is exfoliated and used for it. Adhesion temperature is 200 degrees C or less, and is 100 degrees C - 200 degrees C preferably.

[0014] Moreover, the adhesives used for the adhesive film for semi-conductor immobilization of this invention consist of thermoplastic polyimide, an epoxy resin, and a curing agent. After dissolving each adhesives constituent in an organic solvent, obtaining an adhesives solution and carrying out the cast on the film of a mold-release characteristic, heating removal of these adhesives may be carried out in an organic solvent. Although it dissolves thermoplastic polyimide, an epoxy resin, and a curing agent in an organic solvent and is obtained, since an adhesives solution can carry out desiccation removal of the solvent at low temperature comparatively, it is desirable to use the organic solvent containing a cyclic ether system solvent. As a cyclic ether system solvent, a tetrahydrofuran (THF), 1,4-dioxane, and dioxolane may be used preferably. Moreover, although it is more desirable to combine with a polar organic solvent when using the mixed organic solvent which mixed two or more solvents, the effectiveness of this invention tends to discover [the way contained 50% of the weight or more preferably] a cyclic ether system solvent 30% of the weight or more. In addition, as an organic polar solvent combined with a cyclic ether system solvent, acetamide system solvents, such as formamide system solvents [, such as sulfoxide system solvents / , such as dimethyl sulfoxide and diethyl sulfoxide, / , N,N-dimethylformamide, N, and N-diethyl formamide,], N,N-dimethylacetamide, N, and N-diethyl acetamide, are mentioned.

[0015] More than 50 mol % of the acid 2 anhydride residue by which the fusibility thermoplasticity polyimide of this invention is contained in a molecule although almost all thermoplastic polyimide is insoluble or refractory to these solvents is a general formula (1).

[0016]

[Formula 5]

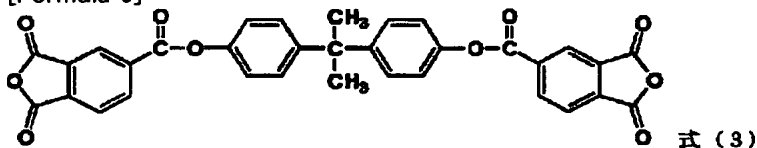


(式中、Xは $-(CH_2)_k-$ 、または芳香環を含む二価の基を示し、kは1以上10以下の整数である。)

Since it comes out and is characterized by being the ester acid 2 anhydride residue expressed, it can dissolve also in these organic solvents. As a desirable example of acid 2 anhydride expressed with a general formula (1) 2 and 2-screw (4-hydroxyphenyl) PUROPANJIBENZOETO -3, 3', 4, 4'-tetracarboxylic dianhydride, A p-phenylene screw (trimellitic acid monoester anhydride), 4, and 4'-biphenylene screw (trimellitic acid monoester anhydride), 1, 4-naphthalene screw (trimellitic acid monoester anhydride), 1, 2-ethylene screw (trimellitic acid monoester anhydride), 1, 3-trimethylene screw (trimellitic acid monoester anhydride), It is a formula (3) although 1, 4-tetra-methylenebis (trimellitic acid monoester anhydride), 1, 5-pentamethylene screw (trimellitic acid monoester anhydride), 1, and 6-hexa methylenebis (trimellitic acid monoester anhydride) etc. is mentioned.

[0017]

[Formula 6]

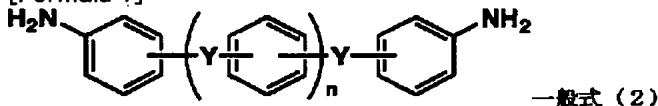


It comes out and 2 expressed, 2-screw (4-hydroxyphenyl) PUROPANJIBENZOETO -3, 3', 4, and especially 4'-tetracarboxylic dianhydride are desirable.

[0018] Moreover, as the acid 2 above-mentioned anhydride and a diamine component made to react, it is the following general formula (2).

[0019]

[Formula 7]



(式中、Yは $-C(=O)-$ 、 $-SO_2-$ 、 $-O-$ 、 $-S-$ 、 $-(CH_2)_m-$ 、 $-NHCO-$ 、 $-C(CH_3)_2-$ 、 $-C(CF_3)_2-$ 、 $-C(=O)O-$ 、または単結合を示す。
mおよびnは1以上5以下の整数である。)

It comes out and the diamine compound expressed, especially screw (amino phenoxyphenyl) sulfone are desirable. In addition, in a general formula (2), you may differ, even if two or more Y is the same between each repeat unit, and the hydrogen of each benzene ring may be suitably permuted by substituents various by within the limits which this contractor can consider. For example, although halogen radicals, such as hydrocarbon groups, such as a methyl group and an ethyl group, and Br, Cl, can be mentioned, it is not limited to these substituents. Furthermore, among the diamine compound expressed with a general formula (2), since the diamine compound which has an amino group in the meta position has the good solubility to the organic solvent of the thermoplastic polyimide which used it, the adhesives solution excellent in workability is obtained and it is desirable. In addition, two or more sorts may be mixed and used for the diamine compound expressed with a general formula (2).

[0020] The thermoplastic polyimide which dissolves in the polyimide system adhesives solution of this invention carries out the dehydration ring closure of the polyamide acid polymer which is the precursor, and is obtained. this polyamide acid solution — said acid 2 anhydride carried out and said diamine compound carried out — substantial — etc. — it is used so that it may become a mol, and in an organic polar solvent, a polymerization is carried out and it is obtained.

[0021] This polyamide acid or polyimide is obtained from the polyamide acid polymer which sets in the inert atmosphere of an argon, nitrogen, etc., is made to dissolve or diffuse a diamine compound and acid 2 anhydride in an organic polar solvent first, and is obtained.

[0022] especially the addition sequence of each component is not limited, but adds acid 2 anhydride previously into the organic polar solvent, adds a diamine compound, and is good also as a solution of a polyamide acid polymer — carrying out — some diamine compounds — the inside of an organic polar solvent — previously — optimum dose, in addition a degree — acid 2 anhydride — adding — the diamine compound of the remainder [last] — in addition, it is good also as a solution of a polyamide acid polymer. In addition, well-known various polymerization methods are

in this contractor.

[0023] As an organic polar solvent used for the generation reaction of a polyamide acid solution For example, sulfoxide system solvents, such as dimethyl sulfoxide and diethyl sulfoxide, Formamide system solvents, such as N,N-dimethylformamide, N, and N-diethyl formamide, Acetamide system solvents, such as N,N-dimethylacetamide, N, and N-diethyl acetamide, Phenol system solvents, such as pyrrolidone system solvents, such as a N-methyl-2-pyrrolidone, a phenol, o-, m- or p-cresol, KISHINORU, a halogenation phenol, and a catechol, or hexamethylphosphoramide, gamma-butyrolactone, etc. can be mentioned. Furthermore, it can also use combining aromatic hydrocarbon, such as these organic polar solvents and xylenes, or toluene, if needed.

[0024] The dehydration ring closure of the polyamide acid polymer obtained above is carried out by the thermal or chemical approach, and thermoplastic polyimide is obtained. All of the chemical approach which dehydrates using the thermal approach and dehydrating agent which heat-treat a polyamide acid solution and are dehydrated as the approach of imide-izing are used.

[0025] As a dehydrating agent by the chemical approach, an aliphatic series acid anhydride and aromatic series acid anhydrides, such as an acetic anhydride, are mentioned, for example. Moreover, as a catalyst, heterocycle tertiary amine, such as aromatic series tertiary amine, such as aliphatic series tertiary amine, such as triethylamine, and dimethylaniline, a pyridine, and an isoquinoline, is mentioned.

[0026] The thermoplastic polyimide obtained as mentioned above can be used for preparation of the polyimide system adhesives solution of this invention as a solution as it is. Or although the solvent used for the polymerization of a polyamide acid is melted well, a polyimide solution is thrown in in the poor solvent which polyimide cannot dissolve easily, and after depositing polyimide resin, removing, refining and drying an unreacted monomer and considering as solid polyimide resin, it can also use for the adhesives solution of this invention suitably. As a poor solvent to be used, an acetone, a methanol, ethanol, isopropanol, benzene, methyl cellosolve, a methyl ethyl ketone, etc. are mentioned.

[0027] As the thermal approach, after carrying out the polymerization of the polyamide acid, it supplies in vacuum oven, for example, and imide-ization is performed by heating under reduced pressure, and the technique taken out as solid polyimide resin is mentioned.

[0028] Especially limitation does not have the epoxy resin used for the adhesives of this invention. Bisphenol A mold resin, such as Epicoat 828 (oil-ized shell company make), Orthochromatic cresol novolak resin, such as 180S65 (oil-ized shell company make), Bisphenol A novolak resin, such as 157S70 (oil-ized shell company make), Tris hydroxyphenyl methane novolak resin, such as 1032H60 (oil-ized shell company make), The naphthalene aralkyl novolak resin of ESN375 grade, tetrapod FENI roll ethane 1031S (oil-ized shell company make), YGD414S (Tohto Kasei), tris hydroxyphenyl methane EPPN502H (Nippon Kayaku), Glycidyl amine type resin, such as special bisphenol VG3101L (Mitsui Chemicals), the special naphthol NC 7000 (Nippon Kayaku), TETRAD-X, and TETRAD-C (Mitsubishi Gas Chemical Co., Inc. make), etc. is mentioned as an example of representation.

[0029] the mixed rate of an epoxy resin — the thermoplastic polyimide 100 weight section — receiving — 1 — 50 weight section — 5 — 40 weight section is preferably desirable. When many [when too few bond strength is low, and / too], it may be inferior to flexibility and thermal resistance.

[0030] If the curing agent is generally used as a curing agent for epoxy resins, it is good anything. A curing agent is added to adhesives for [such as absorptivity, thermal resistance, and an adhesive property] improvement, and the common curing agent for [such as an acid 2 anhydride system, an amine system, and an imidazole system,] epoxy, an accelerator, or various coupling agents are mentioned typically.

[0031] As mentioned above, although explanation about each presentation of the adhesives used for the adhesive film for semi-conductor immobilization of this invention was given, the concentration of the adhesives solution at the time of forming a glue line on the protection film which has a mold-release characteristic is 15 — 30 % of the weight especially preferably ten to 40% of the weight preferably five to 50% of the weight in the amount of solid content (thermoplastic polyimide + epoxy resin + curing agent) which makes solution weight a denominator. Moreover, what is necessary is just to opt for the procedure of the dissolution etc. suitably in consideration of workability etc.

[0032] The semi-conductor fixed adhesive film concerning this invention obtained as mentioned above has the property that it may be used suitably for the tape for TAB, a compound leadframe, the charge of a laminated wood, etc. On the occasion of use — since it is a thin configuration, it specifically excels in micro-processing nature, and thermal resistance and an adhesive property are excellent, and it can paste up at low temperature 200 degrees C or less — it excels in workability. When an example of the adhesion conditions in this case is given, they are about [heating time 5-20 minute] conditions whenever [stoving temperature] in 150 degrees C — 200 degrees C and pressure 0.1-10MPa.

[0033]

[Example] (Example 1) 2 and 2-screw (4-hydroxyphenyl) PUROPANJIBENZOETO -3, 3', 4, and 0.112 mols (henceforth ESDA) of 4'-tetracarboxylic dianhydride were added gradually, having added 3 and 3'-screw (amino phenoxyphenyl) sulfone (henceforth BAPS-M) 0.112mol to the glass flask with a capacity of 1000ml at dimethylformamide (henceforth DMF) 263g, and stirring under nitrogen-gas-atmosphere mind. It stirred for 30 minutes under the ice bath, stirring was stopped in the place where viscosity reached 1500poise(s), and the polyamide acid solution was obtained.

[0034] After adding DMF113g, beta-picoline 26g, and 45g of acetic anhydrides to this polyamide acid solution and agitating for 30 minutes, it agitated for 1 hour and was made to imide-ize under 100 more degrees C. Then, this

solution was hung down little by little into the methanol agitated at high speed. The mixer ground the yarn-like polyimide which deposited in the methanol, the methanol performed Soxhlet washing, it was made to dry at 110 degrees C for 2 hours, and polyimide powder was obtained.

[0035] The polyimide powder obtained above was added to 20g, Epicoat 1032H60 (oil-ized shell company make) were added to 102g dioxolane, it stirs,g [5], 4, and 4'-diamino diphenyl sulfone (curing agent) 1.5g was dissolved, and the polyimide system adhesives solution was obtained (solid-content concentration: SC=20%).

[0036] The obtained polyimide system adhesives solution was cast so that the thickness after desiccation might be set to 5 micrometers on the mold release processing PET film (SERAPIRU BL, Oriental metallizing company make) of 25-micrometer thickness, and it dried for 10 minutes at 120 degrees C after desiccation for 10 minutes by 100 degrees C, and the adhesive film was obtained.

[0037] (Example 2) Fusibility thermoplasticity polyimide was obtained like the example 1 except setting an acid component to TMEG. The polyimide powder obtained above was added to 20g, Epicoat 1032H60 (oil-ized shell company make) were added to 102g dioxolane, it stirs,g [5], 4, and 4'-diamino diphenyl sulfone (curing agent) 1.5g was dissolved, and the polyimide system adhesives solution was obtained (solid-content concentration: SC=20%).

[0038] The obtained polyimide system adhesives solution was cast so that the thickness after desiccation might be set to 5 micrometers on the mold release processing PET film (SERAPIRU BL, Oriental metallizing company mak) of 25-micrometer thickness, and it dried for 10 minutes at 120 degrees C after desiccation for 10 minutes by 100 degrees C, and the adhesive film was obtained.

[0039] (Example 3) Fusibility thermoplasticity polyimide was obtained like the example 1 except setting an amine component to APB. The polyimide powder obtained above was added to 20g, Epicoat 1032H60 (oil-ized shell company make) were added to 102g dioxolane, it stirs,g [5], 4, and 4'-diamino diphenyl sulfone (curing agent) 1.5g was dissolved, and the polyimide system adhesives solution was obtained (solid-content concentration: SC=20%).

[0040] The obtained polyimide system adhesives solution was cast so that the thickness after desiccation might be set to 5 micrometers on the mold release processing PET film (SERAPIRU BL, Oriental metallizing company mak) of 25-micrometer thickness, and it dried for 10 minutes at 120 degrees C after desiccation for 10 minutes by 100 degrees C, and the adhesive film was obtained.

[0041] (Example 4) Fusibility thermoplasticity polyimide was obtained like the example 1 except setting an acid component to TMEG and setting an amine component to APB. The polyimide powder obtained above was added to 20g, Epicoat 1032H60 (oil-ized shell company make) were added to 102g dioxolane, it stirs,g [5], 4, and 4'-diamino diphenyl sulfone (curing agent) 1.5g was dissolved, and the polyimide system adhesives solution was obtained (solid-content concentration: SC=20%).

[0042] The obtained polyimide system adhesives solution was cast so that the thickness after desiccation might be set to 5 micrometers on the mold release processing PET film (SERAPIRU BL, Oriental metallizing company make) of 25-micrometer thickness, and it dried for 10 minutes at 120 degrees C after desiccation for 10 minutes by 100 degrees C, and the adhesive film was obtained.

[0043] (Example 5) The polyimide powder obtained in the example 1 was added to 20g, TETRAD-C (Mitsubishi Gas Chemical Co., Inc. make) was added to 102g dioxolane, it stirs,g [5], 4, and 4'-diamino diphenyl sulfone (curing agent) 1.5g was dissolved, and the polyimide system adhesives solution was obtained (solid-content concentration: SC=20%).

[0044] The obtained polyimide system adhesives solution was cast so that the thickness after desiccation might be set to 5 micrometers on the mold release processing PET film (SERAPIRU BL, Oriental metallizing company make) of 25-micrometer thickness, and it dried for 10 minutes at 120 degrees C after desiccation for 10 minutes by 100 degrees C, and the adhesive film was obtained.

[0045] (Example 1 of a comparison) The polyimide system adhesives solution obtained in the example 1 was cast so that the thickness after desiccation might be set to 15 micrometers on the mold release processing PET film (SERAPIRU Q-1, Oriental metallizing company make) of 25-micrometer thickness, and it dried for 10 minutes at 120 degrees C after desiccation for 10 minutes by 100 degrees C, and the adhesive film was obtained.

[0046] (Example 2 of a comparison) 0.112 mols (henceforth BPDA) of biphenyl tetracarboxylic dianhydride were added gradually, having added 3 and 3'-screw (amino phenoxyphenyl) sulfone (henceforth BAPS-M) 0.112mol to the glass flask with a capacity of 1000ml at dimethylformamide (henceforth DMF) 263g, and stirring under nitrogen-gas-atmosphere mind. It stirred for 30 minutes under the ice bath, stirring was stopped in the place where viscosity reached 1500poise(s), and the polyamide acid solution was obtained.

[0047] After adding DMF113g, beta-picoline 26g, and 45g of acetic anhydrides to this polyamide acid solution and agitating for 30 minutes, it agitated for 1 hour and was made to imide-ize under 100 more degrees C. Then, this solution was hung down little by little into the methanol agitated at high speed. The mixer ground the yarn-like polyimide which deposited in the methanol, the methanol performed Soxhlet washing, it was made to dry at 110 degrees C for 2 hours, and polyimide powder was obtained.

[0048] The polyimide powder obtained above was not able to be dissolved in dioxolan . (Solid-cont nt concentration: SC=20%) .

[0049] (Example 3 of a comparison) 2 and 2-screw (4-hydroxyphenyl) PUROPANJIBENZOETO -3, 3', and 4 and 0.112 mols (henceforth ESDA) of 4'-t tracarboxylic dianhydride were added gradually, having added oxy-dianiline (henceforth ODA) 0.112mol to the glass flask with a capacity of 1000ml at dimethylformamide (henceforth DMF) 263g, and stirring under nitrogen-gas-atmosphere mind. It stirred for 30 minutes under the ice bath, stirring was stopped in the plac where viscosity reached 1500poise(s), and the polyamide acid solution was obtained.

[0050] After adding DMF113g, beta-picoline 26g, and 45g of acetic anhydrides to this polyamide acid solution and agitating for 30 minutes, it agitated for 1 hour and was made to imide-ize under 100 more degrees C. Then, this solution was hung down little by little into the methanol agitated at high speed. The mixer ground the yarn-like polyimide which deposited in the methanol, the methanol performed Soxhlet washing, it was made to dry at 110 degrees C for 2 hours, and polyimide powder was obtained.

[0051] The polyimide powder obtained above was not able to be dissolved in dioxolan (solid-content concentration: SC=20%).

[0052] (Example 4 of a comparison) Fusibility thermoplasticity polyimide 20g obtained in the example 1 was dissolved in THF, and the fusibility thermoplasticity polyimide solution was obtained. The obtained solution was cast so that the thickness after desiccation might be set to 5 micrometers on the mold release processing PET film (SERAPIRU Q-1, Oriental metallizing company make) of 25-micrometer thickness, and it dried for 10 minutes at 120 degrees C after desiccation for 10 minutes by 100 degrees C, and the adhesive film was obtained.

[0053] (Example 5 of a comparison) The plater bond M1276 (copolyamide, the Japanese Lil Sun Co., Inc. make) was dissolved in 10g, 20g and diamino diphenyl aphen 1g were dissolved for Epicoat 1032H60 (oil-ized shell company make) in 83g dioxolane, and the adhesives solution was obtained. The obtained solution was cast so that the thickness after desiccation might be set to 5 micrometers on the mold release processing PET film (SERAPIRU Q-1, Oriental metallizing company make) of 25-micrometer thickness, and it dried for 10 minutes at 120 degrees C after desiccation for 10 minutes by 100 degrees C, and the adhesive film was obtained.

[0054] (Characterization of a film-like laminating member)

1. Laser processing was carried out on condition that below micro-processing nature, and configuration observation was performed in SEM.

[0055] The degree of a taper was evaluated in three steps.

[0056] O Use device : UV individual laser (the 3rd higher harmonic of YAG), lambda=355nmO bore-diameter:40micrometerO rate:100 hole / secO laser oscillation:20kHzO .. A taper and a hole are fitness **. A hole is x in which weld flash remains although it has opened.. It is 2. peeling strength with the part into which the hole has not opened. [Peeling strength when pasting up a laminating member and copper foil in the following procedures was measured.]

[0057] The adhesive film for semi-conductor immobilization was inserted between a polyimide film (APIKARU 25AH, Kaneka [Co., Ltd.] Co., Ltd. make) and 18-micrometer electrolytic copper foil, heating pressurization was carried out for 20 minutes by the temperature of 200 degrees C, and pressure 3MPa, and the copper-clad flexible laminate was obtained. The obtained copper-clad flexible laminate lengthens, and it removes, and is JIS about reinforcement. It measured according to C6481. However, the conductor width was measured by 3mm.

[0058] 3. Using the copper clad laminate obtained by heat-resistant two, lengthen 1000 hours after 150 degree-Cx, remove, and it is JIS about reinforcement. It measured according to C6481. However, the conductor width was measured by 3mm.

[0059] The characterization result of the film-like laminating member of an example and the example of a comparison is shown in Table 1.

[0060]

[Table 1]

	レーザー加工性	接着強度 (N/cm)	
		常温	150°C×1000時間
実施例 1	○	9	7
実施例 2	○	10	6
実施例 3	○	9	7
実施例 4	○	11	6
実施例 5	○	10	7
比較例 1	×	9	7
比較例 2	—	—	—
比較例 3	—	—	—
比較例 4	○	1	1
比較例 5	○	8	2

[0061]

[Effect of the Invention] The adhesive film for semi-conductor immobilization of this invention has the configuration which carried out the laminating of the adhesives layer which can be pasted up below 200 degrees C which consists of solvent fusibility thermoplasticity polyimide, epoxy resins, and curing agents on a protection film with a mold-release characteristic, and can realize micro-processing nature excellent in setting the total thickness to 10 micrometers or less. Moreover, it can have the outstanding adhesive property and thermal resistance by constituting a glue line from fusibility thermoplasticity polyimide resin, an epoxy resin, and its curing agent.